# The JOURNAL

FALL 1961

OF THE

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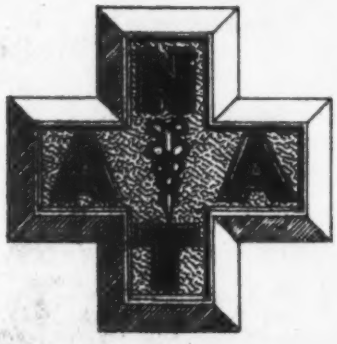


13th ANNUAL MEETING

ALBUQUERQUE, NEW MEXICO, JUNE 11, 12, 13, 1962

## PRE-SEASON TRAINING

ROSS MOORE, Athletic Trainer

Texas Western College

El Paso, Texas

Step number one in pre-season training is a thorough physical examination by a competent physician of every potential ball player. There should be a form for the doctor to fill out that will specifically show whether the boy is fit for contact sports. Player, coach, and trainer should follow the doctor's recommendation.

The preliminary training for the season should start a month before the first practice, if a game is scheduled for two or three weeks later. At least six weeks must be taken to get in good physical condition.

The factors involved in the overall training program are balanced diet, proper sleep, and graduated muscular exercises.

You, as coach or trainer, should emphasize the importance of diet and sleep. Insist that the boys eat three balanced meals a day and forget about the snacks in between. Emphasize too, that they need 8-10 hours sleep at night. The boy who gets only a few hours will be lazy and sluggish; he will loaf in practice; and he is more likely to get hurt.

The athlete inherits the potential qualities of his body, but there is still much that he must do to develop that into a strong and efficient machine. Conscientious training and right living can strengthen and bring out one's natural abilities, such as a strong heart, good wind, steady nerves, strong vital organs, speed, proper muscular strength, muscular coordination, and stamina or staying power.

A large part of the conditioning program should be running to build up stamina. There should be some charging to develop leg muscles. Gymnastics, limited weight lifting, and bar work are good to build arms and shoulders. The players, too, should include as many football skills as possible in this training—for instance, an end can develop wind and legs while practicing catching passes. Each player should try to build up his body. Extra weight is very desirable if it is in the form of muscles and not fat. And faithful practice will do much to make up for lack of natural coordination.

When you start your training program, have a definite set of exercises to give that will develop the whole body and not just a few parts. Stretching exercises are particularly beneficial. Regular and graduated exercises will cut down on your minor injuries in early training.

One of the most common minor injuries is the groin pull, which, though not serious, is enough to slow a boy down. It is my opinion that this groin muscle is pulled when a player tries to drive off the inside of his foot, causing strain on that particular muscle. To prevent this condition, explain and demonstrate to the player the proper position of the feet when executing a block or pulling out of the line. Have him turn the toe and knee of the back leg in a straight line forward, and he will see how much more drive he has and how much pressure it takes off the groin muscle.

Players who have old injuries, such as to the knee and ankle, should be given special exercises to strengthen the parts affected. *The coach or trainer should supervise*

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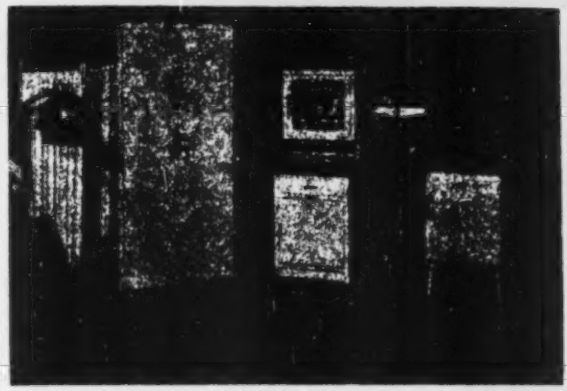

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## PRE-SEASON TRAINING (Continued)

*these exercises*, which should be begun, if possible, during the summer. Exercising four times a day, for fifteen minutes at a time is more effective than once a day for an hour.

Mountain running (if you have mountains) is a good strengthening exercise for knees. We even recommend it and use it for rehabilitating knees that have been operated on. Having the boys run the stadium once a day is also beneficial.

In early practice when the weather is hot, players should be given some water (about mid-practice) to which a little salt is added—a teaspoonful to about seven gallons of water—in order to keep the salt content of the body up. A boy's muscles, mind, and nervous system must function as a whole for him to give his best performance, and this is impossible if the body fluid gets off balance.

Players should also take salt tablets each day to refurnish the body with salt that is lost through perspiration. They will help prevent cramps in the muscles.

Blisters are common in early season. Players should be instructed to report to the coach or trainer as soon as he has a blister so that infection may be prevented. Lots of boys think they are tough and will ignore a small thing like a blister unless it is impressed upon them that they might miss a game later on.

In early season we use Tough Skin and powder to protect the feet. Most blisters can be eliminated by having properly fitted shoes. Boys often get shoes too long in order to have them wide enough. Too much room in a shoe leads to friction which causes blisters. Shoes come in nearly every width now and should be ordered early. Our boys wear only one pair of sox for both football and basketball.

My treatment for blisters is to cut the skin away, then put athletic ointment under a sterile dressing for off-the-field wear. During practice I use Mole Skin with a hole cut out around the blister to which I apply a small amount of vaseline and a sterile dressing.

Last, but certainly as important as any other factor involved in the physical welfare of your players, is the condition of your practice field. The field needs care all year long in order to be grassy and soft and ready for play. This fact can't be stressed too much to coaches and school officials. If all your money goes to fancy equipment and you let nature take care of your practice field, you are likely to have more injuries than nature or anybody else can heal by the time you are ready to PLAY BALL!

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# PROCTOLOGICAL PROBLEMS IN SPORTS

By DR. MAX PHILIP COWETT

Associated Bellevue and University Hospital,

Chief Proctologist of St. John's Hospital

(A copy of the talk given at the Eastern Athletic Trainers Association Meeting and Clinic held in New York on January 16 and 17, 1961.)

I have been told that this is the first time a talk on the rectal or anal conditions of athletes has ever been given. As you trainers and coaches know, it is nice to be the first one.

Before discussing the proctological conditions in athletes, I want to make it clear that athletes are not immune to any condition or any disease that the lay public or people in other groups have. They are prone to everything. What are the most common conditions in athletes? As I see it, the most common condition firstly, are hemorrhoids. What is a hemorrhoid? A hemorrhoid is nothing but a dilatation of the venous plexus in the rectum. One wants to remember they are veins, not arteria. Some of the arterioles, the smaller arteries go into the formation of hemorrhoids too. Anything that causes a stasis in the intestinal tract or a congestion can produce hemorrhoids. Athletes are more prone to this. Am not going to give a diadactic talk on the causes that produce hemorrhoids. If I did, it would take me two hours. In athletes, the main cause is constipation. Why do they develop constipation? They develop constipation because as the previous speaker said they are tense, they are anxious, they lose a lot of fluids, they develop a spasticity of their intestinal tract. The majority develop a spastic colon. So, there is a congestion in the venous plexus and a back flow as a result of this spasus. Now if you can remember that physical fact, that they develop a spasus, in other words a slowing of the blood stream going back into the portal circulation. That primarily is the cause. They also develop infections which causes an edema and swelling and in that way produce pain and spasm. What types of hemorrhoids are there? To the trainer, to the coach or to the physician we speak of two types, the external and the internal. The external are minor things, and you can tell today on Monday, after the storm, athletes especially who go skiing, hockey players who are out on the ice or people going to football games or football players who sit on the cold ground in the fall, people going to football games in open stadiums, like the Yale Bowl or the Columbia Stadium. Spectators and players sitting on a wet seat can develop thrombae, which are clots in an external vein and cause pain. They are simple things. Your doctor can remove those clots and they won't incapacitate the individual if the clot is removed. If they are not removed, they are painful and the individuals are out of training or out of commission. We get these in the fall season, in the winter season, once in a while in the summer, a swimmer sitting on the wet sand or on the edge of a swimming pool will develop the same thing. Jockeys and people who do horseback riding develop these as well.

The other type, which is more serious, is the internal type. They are the type that a lot of times the athletes would tell you about. They bleed a little but will not make any comment unless they have pain. They develop pain with hemorrhoids as a result of a break in the mucosa which some trainers or some coaches know, and doctors know as a fissure. It is like a cracked lip here. These are very painful lesions and they usually occur between two hemorrhoids or as a result of straining at stool. That's what these tense young men do, they strain and push quite a lot and they develop hemorrhoids and breaks in their mucosa. If this continues, the hemorrhoids will develop first a mucosal outgoing so to speak, and they develop prolapse. I have seen a few athletes, very few, who had a real prolapse which is bad, because they have to have a major operation and probably have to be incapacitated from athletic activities for any future time. But, a fissure which is painful produces other things. The next most common thing in athletes are infections around the anus and rectum. Infections as a result of, we know, that organisms are present in the intestinal tract all the time. Some of them are not pathogenic but they become pathogenic when resistance of the individual is low and he is all petered out and some of these non-pathogenic organisms become pathogenic and develop serious infections. Starting out as a fissure initially, the infection spreads towards the posterior and they develop abscesses and then fistula.

The thing I want to warn trainers and coaches about is that when you have these individuals, these young athletes who develop infections like a fissure and a fistula don't temporize. Have them consult their doctors, for the simple reason that the longer you delay, the greater the damage. The ultimate damage will result into a fistula. If you open or treat a fissure initially you can cure it, if you open an abscess, don't rely like a lot of people do on antibiotics. To my mind they are necessary, but they have been over-rated. The only way to treat an abscess is to open them up high, wide and handsome because drainage is what counts. Get the pus out and you clear up the abscess.

What type of athletes develop abscesses? What are the factors besides the fact that there is a break in the mucosa? The type of athletes that develop infections are the wrestlers, hurdlers, broad jumpers which I have seen, and pole vaulters and people who get infections as a result of trauma, they fall on their so called sit-downs and they injure the exterior and probably have a previous fissure or large hemorrhoids that aided the infection. There is also the question of clothing that either baseball players or football players use, the jock straps are a little tight or their running pants are tight and infections occur due to trauma. They sweat a lot in this region and that produces infection. Also, I should say, their bowel function is not good, they are constipated, and as a result they can't combat infection like the ordinary individual. That occurs in other groups of individuals, but in athletes who are tense, they develop more frequently.

There is another type of infection besides the so-called fistula, there is a condition that trainers, coaches and doctors know in which there is a congenital defect at the base of the spine. You probably know it as a pilonidal cyst. Many of these are asymptomatic until they are injured in this region, getting kicked at a football game in the posterior or falling and as a result of traumatization they develop infections and these require operations.

What are the other conditions that develop in athletes? So-called irritation around the anal orifice, a result as I said of poor rectal hygiene. A lot of athletes, whether you come from Princeton, Yale or Harvard, don't know how to clean themselves, it is true. I see it more than the GP or the medical man. It can occur in individuals on Wall Street, or a President of a corporation. They come in and you look at their underwear and it is dirty. That causes

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## PROCTOLOGICAL PROBLEMS (Continued)

an irritation and it starts itching. There may be other factors besides the mucous discharge from hemorrhoids that causes this irritation. I don't know whether you people require new jock straps every day, some of them are rarely washed. The only way you can clean these up is by autoclaving and I don't know whether your training table is equipped with an autoclaver but I would suggest it if you get many of these perianal infections. Any skin condition that occurs in other parts of the body such as eczema, psoriasis and many others are irritating. I have seen several cases in athletes of inflammation of nerve ends. You probably refer to it as shingles if this condition is seen on the chest. I have seen it around the anus and it is the most painful condition in the world. You can get fungus infections, especially athletes develop athlete's foot or feet. They start scratching, don't clean themselves and then they scratch about the anus. This condition is frequent and if detected early can be cleared up. In young athletes I have seen two cases of pinworms which caused perianal irritations. In prep schools it may occur, and also in the older group. Have seen irritations in swimmers around the anal region and also in the axilla as a result of chlorine irritation and they are nasty things to treat. There are certain people who develop allergies, some people can't eat strawberries or tomatoes, or fish, or whatnot, and those individuals whether they be athletes or other groups may develop an irritation.

Young people can develop polyps or have polyps I should say, and are rarely diagnosed by the doctor at college or prep school or the club. They are found usually on proctoscopic or x-ray examinations. I tell you this story. About fifteen years ago, I had a young man referred to me from a prep school in Connecticut who was in a hurdle race or a dash, I forget which, and he collapsed. They had found blood on his shorts and the doctor up there sent him to New York. He sent him to a friend of mine who said "I can't find out what's wrong with this boy." I examined the boy and found he had a polyp about five or six inches from the anal orifice. It was non-malignant and we removed it and he never had any more trouble. These polyps can only be detected by x-ray or by protoscopic examination.

Another condition which can be detected by protoscopic or sigmoidoscopic examinations is the colitises. You people who send teams down across the border to Mexico, to South America, etc., and I have had one athlete that came back from South America and I've had a ball player too, came back with amoebic colitis. If he hadn't got back early, he would have been a sick boy. So, you want to be on guard if you send them abroad or down south, be on guard for colitis whether it be amoebic or other types.

Now in closing, and more serious, our greatest threat in medicine and surgery is cancer. I am going to tell you a story of a second year medical student who was a basketball player in Michigan. He came down to our school, and was the nicest boy I have ever seen, handsome and stocky. Our Chief Surgeon Dr. Wright said "this boy is bleeding, I think he has hemorrhoids, will you see him?" I said, "Sure I'll see him." The man came into my examining room and I examined him. Within reach of my examining finger I felt one of the biggest masses I have ever felt. This boy was only 24 years old. I walked back to Dr. Wright and I said, "Arthur this boy has a cancer." He said, "Get out of here, you're crazy." The end of that story was the boy was operated on within two weeks and it was proven cancer, he died within six months. The point I want to make is this. In these younger groups, if you spot a cancer early, you may do him some good but if you don't, they are dead "ducks." So, the lesson I want to tell you trainers, doctors and coaches is, that you know specialists can become very narrow. They think their specialty is the only one that is important. If we are going to save people from developing cancer, there is no reason why they can't have a good rectal examination by a competent man.

I should have been the last one on the program because that's my specialty. I may have given you trainers and coaches a pain in your "sit-down" that you sometimes get when you're being pushed around by the alumnae or whatnot for not having winning teams but, if I can get this message to you, don't allow these minor rectal conditions to go too far in athletes. If you get them early, you can clear them up but if you don't you get into trouble.

Thank you ever so much.

Question: I am not a trainer, but here as a newspaperman, but something occurred to me doctor. Is it possible for a fellow to develop any rectal disorders from sitting on the bench too much?

Dr. Cowett: If it is a cold day and it is wet—yes, that is possible.

Question: We have problems with professional athletes doctor, we play in cold weather frequently, we haven't had a chance of warming up, would you say a warm up is necessary as a preventative against any anal conditions such as hemorrhoids, before they go out to play the game?

Dr. Cowett: No, I don't think so. Let me tell you something about concentration. This is probably going to hit the newspapermen, but the public has been brain-washed by newspapers, TV and radio on constipation. Constipation is really a relative thing. We did a piece of work several years ago or maybe ten years ago. We took four hundred students, did x-ray studies on them with markers and in only about 40% of those 400 had bowel movements in other words, every day. Normal individuals, the rest of them had bowel movements every two days, every three days. There are some normal individuals who have bowel movements twice a day, three times a day, so the thing that causes hemorrhoids, constipation is a relative thing. In some individuals I say they move normally once a day, in some people twice a day. We had one group, one student once every five days without developing any toxic symptoms, headache or anything else or spasus, and he had no hemorrhoids. Does that answer your question?

Question: I was just wondering about strain?

Dr. Cowett: There is no question that straining a stool is a factor.

Question: Well, I was wondering about strain when they are cold and they have to compete, and the strain on their intestinal tract?

Dr. Cowett: I don't think that is a factor. You have a good man down in Philadelphia, Ted Bacon, if you ever get in trouble about hemorrhoids.

Question: How effective is a sitz bath after a cold day on the bench?

Dr. Cowett: Very good. It reduces the—if you have hemorrhoids that's what they use. If you have a fissure that's what we tell you to do.

Question: Doctor, we've had problems rectally with professional basketball players, quite a few of them through the years. How much of a problem would it be in the pre-season physical for a GP to do say a series of

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## PROCTOLOGICAL PROBLEMS (Continued)

20 of them at a time—you would have to have 20 proctoscopes, is it practical in a physical?

Dr. Cowett: If he is competent, I'd say yes, and some of them are. It all depends, we have some poor doctors, I hate to say this, and we have just as you have, some poor trainers and some poor coaches. I think preventative measures and good public health measures is an excellent idea.

Question: In other words, just going further than just with the light and a routine look for just external hemorrhoids would be a good policy but is it practical in say just a school situation or where there are a lot of men going through—it wouldn't take too much time would it?

Dr. Cowett: Let me tell you something. I'm consultant in a few of the commercial firms and they require every one in their company to be protoscoped, why can't athletes?

Question: But, it is something that is not done in most instances with routine physicals.

Dr. Cowett: It should be done. I told you I am narrow. Specialists are narrow, they can only see their own specialty. We think it should be done because if you can prevent cancer and polyps which are the precursors of cancer you are going to be better doctors and more helpful in helping mankind.

Question: Doctor, is there a particular body type more prone to rectal difficulties?

Dr. Cowett: That is a good question. These short stocky individuals probably are more prone. It is not true though, I mean completely true. I see them more frequently, they strain at stool, they have shorter venous channels, there is also a generic factor too, that some people have a weakness in their venous system. I have operated on mothers and subsequently their daughters or sons have had hemorrhoids. As I get older I get the sons and daughters of parents who I have operated on for hemorrhoids. It is a congenital thing as well. Does that answer your question?

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## CONCUSSIONS

By DR. ROBERT E. MORGAN

To me, the concussion is the most serious injury that an athlete can receive. Of 117 football deaths occurring in colleges and schools between 1931 and 1934, 78 were caused by injuries to the head and neck. These figures are according to Lloyd, Deaver, and Eastwood. Eastwood, however, reports in The Fourteenth Annual Survey of Football Fatalities that in 1945 only six deaths were reported: only three in high school and three in sandlots were reported to have died of head injuries. This is about one fatality for every 200,000 players.

In most states, when a boxer is knocked down three times in one round, the fight is stopped. In some states, a boxer cannot participate in a contest for six weeks after he has been knocked out.

The term "brain concussion" describes absolutely nothing as far as medical diagnosis is concerned. It actually refers to an abnormality of behavior following a blow to the individual's head. All do not agree on what happens in the skull frame after trauma. However, most agree that there is a loss of blood to the brain because of compression of the ends of blood capillaries, causing loss of nourishment. The period of unconsciousness following a brain blow is usually short-lived.

Three types of concussion in athletes are recognized.

1. Mild type in which the patient is momentarily knocked out. He regains all his intellectual functions immediately.

2. Mild type in which the person is what we call "out on his feet." He never loses consciousness and retains some of his intellectual and all of his vegetative consciousness.

3. The more severe type, in which the period of unconsciousness is obvious and exists for a minute or longer and the patient suffers residual symptoms of headache, dizziness, and the complete or incomplete loss of intellect.

Most of these concussions clear up fairly rapidly. Some patients have headaches for as long as one or two days. When a boy is knocked out repeatedly, I believe he should give up the type of sport in which he is being injured.

The first symptom to look for after a blow on the head is amnesia. Memory is the most reliable test (what happened, when it happened, dates, numbers, names).

Eye signs: dilated, fixed pupils in both eyes indicate serious brain damage; double vision (diplopia); lack of eye control (strabismus).

Other signs of concussion are seen in the patient who is dazed, drowsy, belligerent, irritable, irrational, or delirious.

If a boy is knocked out in a game, he should not be returned until his blood pressure and all signs have been checked and have cleared up.

If a boy is unconscious for any length of time, even though he returns fairly well to normal, he should be watched carefully for at least 24 hours for what is called *delayed concussion*. In this violent concussion, the patient is placed in a prone condition, with a cold pack on his head; smelling salts or ammonia is used. Check for any abnormality of the head, and if the patient does not recover rapidly, he should be hospitalized. If in your judgment the concussion has been severe, an electroencephalogram should be made, with lumbar puncture and hourly check on blood pressure and pulse. All this should be done under direction of a neurosurgeon. X-ray studies should be made of all these cases.

Very seldom does an athlete who has regained consciousness after being knocked out become unconscious again.

I want to remind you again that, according to Dr. Thorndyke of Harvard University, 44.7 per cent of all football fatarities recorded from 1931 to 1945 were the results of cerebral hemorrhages; 22.5 per cent resulted from spinal injuries; and 29.8 per cent were caused by abdominal or visceral injuries (this suggests inadequate medical attention).

Since I have been in sports, I have had to ask that three participants not be allowed to participate in sports because of recurrent head injuries.

## CONTROVERSIAL CALISTHENICS

*Comment by the National Federation of State High School Athletic Associations and the Committee on the Medical Aspects of Sports of the American Medical Association.*

The deep knee bend and "duck waddle," which have been used traditionally as training activities for football and some other sports are now generally disapproved by medical authorities, according to the Committee on the Medical Aspects of Sports of the American Medical Association. Both exercises have a potential for serious injury to the internal and supporting structures of the knee joint, one of the most vulnerable parts of the athlete's body.

In the deep knee bend, the athlete moves alternately from a standing position to a full squat; in the duck waddle, he travels about while trying to maintain the full squat position. Both exercises involve complete flexion and often twisting of the knee which can result in cumulative deterioration or immediate injury to the meniscus (cushioning cartilage) of the joint. The incidence of such meniscal injury following the use of these exercises is sufficient to warrant dropping them from the training program, the A.M.A. Committee noted.

In addition to their injury hazard, the deep knee bend and duck waddle have questionable values as conditioning exercises. Few, if any, of the football player's activities involve complete flexion of the knee and thus neither exercise relates directly to the game. The best conditioning activities, except for those to increase general power and endurance, it is universally agreed, are exercises specifically designed to strengthen those body parts most used and most subject to injury in a particular sport.

Many other exercises, not carrying the same injury hazard as the duck waddle and deep knee bend, are available for athletic conditioning, according to the Committee. These can be found in standard references on fundamental conditioning exercises and athletic training procedures. For best results, regular practice of the prescribed exercises should begin well before the start of organized practice. Faithful adherence to preseason conditioning can be an aid to performance as well as a means of preventing injuries.

## SHOCK

By DR. ROBERT E. MORGAN, M.D.

Southern Methodist University, Dallas, Texas

Shock is caused by many different things, but the kind which primarily concerns us is the shock caused by dehydration or by traumatic injuries. Shock is a condition of acute peripheral circulatory failure due to the arrangement of circulatory control or the loss of circulatory fluid and brought about by injury. It is marked by pallor, clamminess of skin, decrease in blood pressure, feeble rapid pulse, decreased respiration, restlessness, anxiety, and sometimes unconsciousness.

Most cases of shock which we see are mild and do not require too drastic treatment. You can usually have a patient stretch out and elevate his feet and keep him warm. Then if you think he may be a little dehydrated, give him a little water, but not too much.

In traumatic shock, the cause is usually evident. In treating traumatic shock, the treatment varies according to the severity of the shock and the amount of treatment required to restore the circulation. The lengh of time elapsing between the incident and treatment will decide the amount of treatment necessary. Constant check on the level of arterial blood pressure still is the best index to the degree of shock.

Persons in shock are in danger of sudden death and must be closely and continuously watched until circulation is restored. When head or chest injuries are causing shock, the head or chest might have to be elevated; otherwise, the feet. Keep the body warm. The patient should be kept quiet. As a rule, about ¼ grain of morphine will quiet him. If the patient complains of thirst, he may be given water or, preferably, saline solution. In severe shock, water is allowed only in sips, and sometimes not at all. Adrenalin chloride solution, epinephrin, caffeine, or other stimulants may be used if necessary. The definitive treatment of traumatic shock is by fluid replacement given immediately to restore circulating blood and tissue fluid volume. Whole blood is the fluid of choice.

In deep shock, vomiting often occurs and is a grave danger to the patient. The patient should lie with his head turned to one side, and if he vomits, the oral air passages must be quickly cleared. A suction apparatus should be kept constantly available.

In cases of even mild shock, we send the boys to the infirmary, where they can be watched and checked for at least 24 hours.

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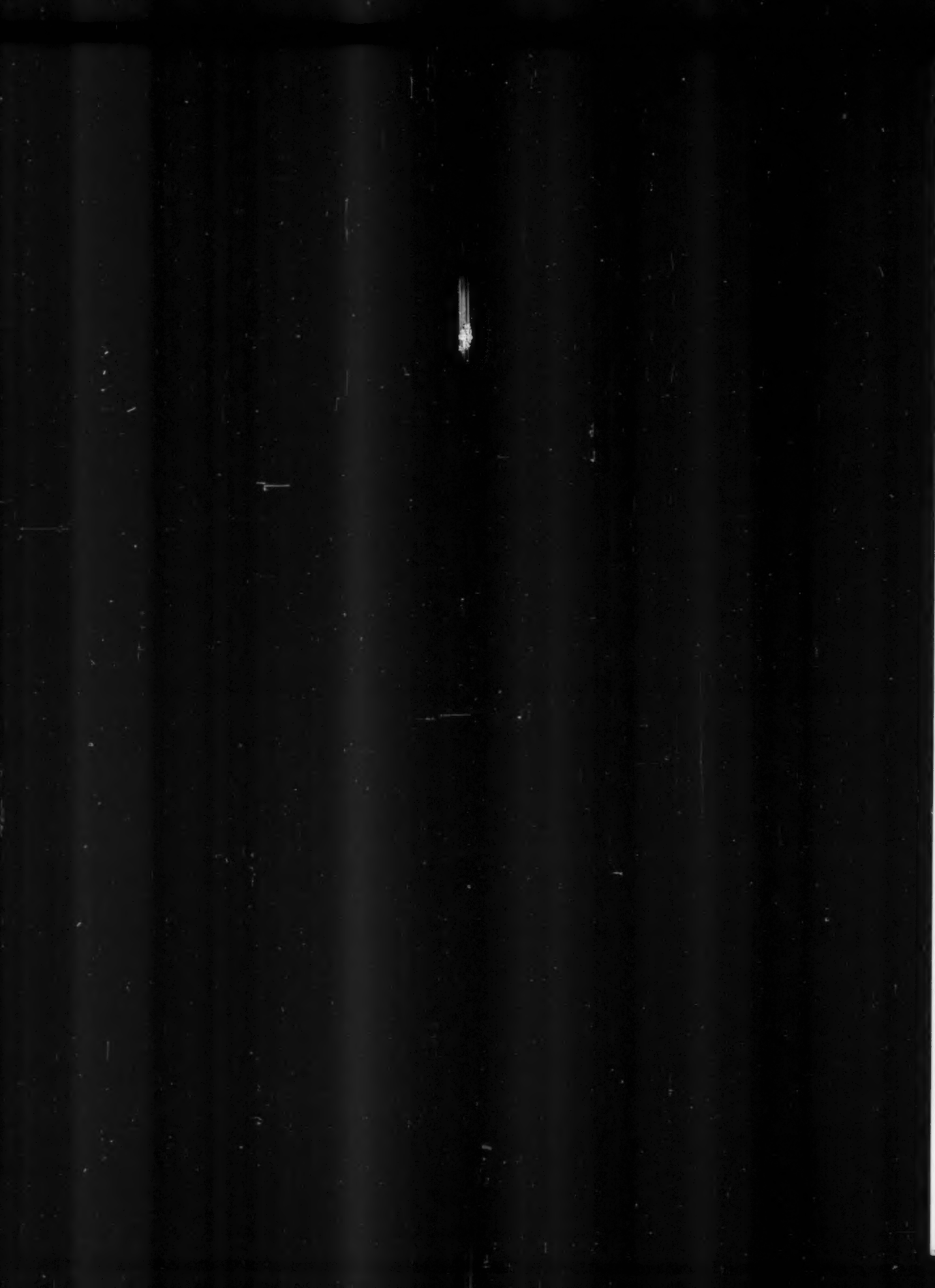

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## LEGAL RAMIFICATIONS OF ATHLETIC INJURIES

By WILLIAM N. HARSHA

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The physician has been an integral part of athletic competition throughout history, both in the preparation of athletes for these functions and in the care of injuries. As athletics become more highly organized and as younger age groups are included, he is called on more and more to supervise and care for these youths. Paralleling the increased participation in athletic endeavors is the apparent rise in the number of litigious persons in this country, and thus it behooves all persons interested in sports to be apprised of the possible legal ramifications of athletic training and athletic injuries.

I have had the opportunity and the distinct honor of being the team doctor for a high school for several years and have become well acquainted with the problems of athletes as well as those of their coaches. Although lawsuits involving school districts and coaches are quite rare, all persons interested in school athletics need to be well informed concerning the possibility of such lawsuits and how to cope with the problem intelligently.

Students in high school, college, junior high school and even grammar school who engage in bona fide school athletics usually are required by the school board to sign a release for bodily injury that might result from such participation. This release, signed by parent or guardian, is a legally binding document. It protects the school board, coaches and teachers from personal liability for the usual activities of engaging in sports. The definition of "usual activities" and of what constitutes unusual activities is extremely important. Athletic endeavors that are directly controlled and supervised by the school board, coaches and teachers may be the basis for personal involvement in litigation if there is negligence on the part of these groups. Releases given by parents for the usual athletic endeavors do not include negligence or failure to recognize an injury, or direct instruction by a coach or teacher or school to play in an injured state or with inadequate equipment. For example, a high school which equips its football players with worn-out shoulders pads is not protected by the bodily-injury release, nor is the coach who instructs a player who sprains his ankle during a game to get up and run it off and returns him to the game, only to find later a fracture with serious damage to the ankle has occurred.

A great need in our school system at present in regard to protective gear for athletes is a system of sharing the responsibility with groups competent to judge the adequacy of equipment. The average football coach is more than competent to evaluate the equipment provided for his team, but frequently the school board insists that he use worn-out, lightweight or inadequate gear. The school district, of course, incurs a very real risk if an injury of a player is due to inadequate equipment. A case in point is Govel versus Board of Education, New York, in 1944 (citation, 267 App. Div. 621). The coach, training students for a track meet, did not place mats under a set of crossbars, and one of the players fell and was injured. The mats were available, but through the coach's oversight or negligence they were not used. A judgment was returned against the board of education.

Most school districts insist on general physical examinations for athletes. Although there is no legal insistence on this practice, it offers a higher degree of protection both to the school district and to the athletes. The parent releases the child to athletic endeavors in the physical condition in which he enters the school. The school then does not have a duty to ascertain whether or not the student has a disabling medical disease. Once it does have information that he has a disabling medical disease, however, if the school or coach obliges the athlete to play, to the latter's detriment, a release by the parents of any liability for the injury becomes invalid and the school board or coaching staff assumes the risk.

### ADEQUATE CONDITIONING AND TRAINING

It has been demonstrated repeatedly that the most effective way to prevent major athletic injuries is by adequate conditioning and training. High schools and colleges have active training programs for their athletes prior to competition, but in junior high and grammar schools young athletes frequently enter competitive sports with little or no conditioning. All professional people are familiar with the concept of malpractice or negligent practice, and all athletic coaches as part of their training are made keenly aware of the necessity of adequate conditioning and training. Thus the coach who assumes the responsibility of sending an unconditioned or untrained athlete into active contact competition reasonably incurs a liability for any injuries which might result. The parent who signs a release and allows his child to engage in such athletics jointly shares this liability, and it would be difficult to decide whether the coach or the parent was legally responsible if any injury based on inadequate conditioning occurred. In the case of Medsker versus Etchison in 1936 (101 Ind. App. 369) it was argued that the athletic coach was unskilled and untrained and as a result the players were not conditioned adequately and the athlete Medsker was injured. It was held that parents accept the

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## LEGAL RAMIFICATIONS (Continued)

athletic department at face value for the caliber of its coaching staff. A small school, such as the one concerned in this case, could not expect to have the expert coaching staff that a major university might have. Nonetheless this example does point up an avenue of thinking, and certainly aside from any legal ramifications it is a sound medical concept to insist on adequate training. Most high schools allow a two week training period before the first scheduled football or basketball game. This perhaps is not a long enough period, but certainly it is far better than no training period at all.

### THE RISK IN EVALUATING ATHLETIC INJURIES

The athletic coach is the key person in regard to possible negligence. Although he is automatically protected by the school board and school district, if he acts in a manner contrary to the board's instruction, he incurs total liability. In most jurisdictions the school board has to agree to a lawsuit before it can be sued. However, if a real cause for action is present, it is difficult for a governmental agency to refuse testing the case in court.

The evaluation of athletic injuries, particularly in football or basketball players injured during a game, constitutes a real risk to the coaching and teaching staff. Many times the coach or trainer examines such a player and, assuming the injury to be a minor sprain, returns the athlete to the game without a period of observation. In Duda versus Gains (12 N. J. Super. 326) a young athlete dislocated his right shoulder during a game. The coach examined him and told him medical treatment was unnecessary. He was returned to the game, thereby worsening his injury. A verdict against the coach was substantiated. In LaVelley versus Stanford (272, App. Div. 183) a young athlete appeared fatigued and did not perform as well as the coach felt he should. He was obliged by scholastic threats to drive himself harder, and as a result had a nervous relapse. Medical testimony was sufficient to show that the unusual energies of the coach aggravated the student's condition. A verdict was awarded against the coach. This is an extreme verdict.

Most significant injuries to the extremities are manifested by pain, swelling and deformity either immediately or within 5 to 10 minutes, and it probably is wise to remove an injured player from a game for that period of time. Another problem that arises is a player's insistence that he is not injured. The coach, perhaps against his better judgment, may return such a player to the game because the player is afraid he will lose face among his colleagues if he admits to the possibility of a disabling injury. In Sayer versus Roger (16 N. J. Super. 22) in 1951 a student deliberately acted against the coach's request and refused to submit to medical examination, continuing in the game. The decision in this case was a difficult one, because the coach did have direct supervision of the player and allowed him to play, but it was also pointed out that the coach did attempt to provide medical attention, which was refused. The verdict at first was awarded against the coach, but later was reversed; in many jurisdictions it could have been held against the coach. The coach does, of course, have absolute control of the game. It takes an astute coach to ferret out these facets of the problem.

There have been situations in which a coach has insisted that an injured player hobble off the field or in which he has examined an injured athlete in such a way as to cause further damage; the latter problem has arisen particularly in cases of injuries of the neck and low back. In one lawsuit, $200,000 was awarded to a football player whose injured neck was sharply manipulated by a member of the coaching staff on the field during examination, resulting in severe injury of the spinal cord. It is therefore imperative that the coach and the training staff be well acquainted with the types of injury that carry very real risks of permanent damage, and that they insist that players with these types of injury be carried from the field properly and that medical attention be sought promptly. Because of the possibility of such an injury in any athletic endeavor, I believe it is quite important to have a physician available at all games and promptly available during practice sessions. Most medical societies are more than ready to furnish this coverage, and it is a rare physician who is unwilling to cooperate.

Occasionally a coach is accused of conducting an unusually rough athletic contest or a disciplinary type of game. There have been several lawsuits in which families have charged that coaches have been unduly forceful with athletes. In certain situations this approaches negligent behavior. Pirkle versus The Oakdale Union Grammar District in 1953 (253 P2d) was a case in which the players on a football team ranged in weight from 90 to 190 lb. In a practice session one of the larger boys tackled a much smaller boy and injured his kidney and right knee. The court held that this constituted negligence on the part of the supervising coach. A further illustration of the close degree of control a coach must exercise is the case of Lee versus Board of Education (263 App. Div. 23). A baseball player in a school game was running for a high fly and stepped out into a street and was struck by a car, receiving severe injuries. It was held that the coach needed to exercise that degree of supervision to reasonably expect a fly ball to be hit into the street and to recognize the possibility that a player might be injured.

### SUMMARY

It is the duty of the school board, the athletic coach, the trainer and the teaching staff to offer athletes competent and supervised coaching and adequate protective equipment and facilities. The release which the parent or guardian signs for the participation of a child in athletics assumes that these are to be made available or, to be legally binding, must specifically exclude one of these items (and, of course, this is facetious thinking). Any member of the teaching or coaching staff can incur personal liability by acting in a fashion which a jury may consider unreasonable under the circumstances for a person trained in coaching or athletics. Avenues for incurring personal liability on the part of the person supervising the athletes are returning an injured player to the game, improper physical care of the injured player, and yielding to personal whims.

Some of the more progressive school systems recently have furnished liability insurance plans which protect school board and coaching staff. The rule in injury cases in such districts with insurance coverage has been that the insurance company can be directly held in suit without the school board's permission. This is one avenue of solving the litigation problem, but, of course, it increases the expense of athletic endeavors, which already is a problem in schools operating on low budgets.

An intelligent approach to the problem is to have available at all times competent medical personnel during athletic encounters, either on call for practice sessions or in the stadium or on the bench during games. All physicians should be willing to give of their time for this purpose, and most of us frankly look forward to doing it.

# THE PATHOLOGY OF TRAUMA: HEALING FACTORS AS THEY APPLY TO INJURIES IN SPORTS

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Injuries in sports are repaired by the same body processes that heal all other injuries. As we follow the sports pages during the football season, it is not uncommon to read of the football player who is injured, unable to practice, and certainly will be unable to play in the weekend game. However, by some stroke of magic at game time he is not only able to play but also turns in an outstanding performance. This leads many people to believe that athletes must heal injuries by different processes than normal individuals, or that miraculous drugs have been injected during the course of the week to make playing possible. Actually there is no question that the well-conditioned individual or athlete heals injuries rapidly. His quick recovery is due to good physical condition and training rather than any miraculous form of treatment. This rapid recovery may also be due to participation in spite of pain rather than because of rapid healing.

Athletic injuries are similar qualitatively to injuries from other causes. No matter how the force is applied, the injury occurs when the normally prevailing anatomical relations are altered by force. In the production of such injuries a moving or stationary object changes the state of uniform rest or motion of the second object. Whether such a collision results in injury depends on several factors of which the most important is the momentum of impact.[1] Other factors being constant the greater the momentum the more severe the injury. When the force is not dissipated but is centered in a small period of time and in a small area the injury is greater. Therefore the shorter the duration of contact and the smaller the area of impact, the greater the injury.

Traumatic injuries depend for their occurrence on a non-uniform change in the state of rest or motion of the body tissues. No injury occurs if the change is uniform. The body structure and condition are of equal importance to the force applied in determining the nature and severity of the injury. Any association with athletics reveals some participants prone to injury and others who are seldom injured. A twelve year association with athletic injuries indicates that resistance to injury is not a result of muscular strength or of body size.[2] The overweight athlete does seem to be prone to injury, as is the player who is not in top physical condition generally, and specifically in training for the sport involved. Minor variations in structure may be significant, as for instance the fact that knee injuries have been relatively common in this period in athletics who tend to be slightly knock-kneed, and uncommon or even rare in those who are bowlegged.

No matter how the tissue destruction is brought about, it initiates the process of soft tissue repair. The degenerating or damaged cells appear to liberate a chemical substance which causes cellular proliferation leading to repair of the injury.[3] The mechanism of soft tissue repair is simple and for purposes of our discussion can be divided into six steps.

1. Destruction of tissue.
2. Effusion of blood and plasma.
3. Coagulation and formation of a fibrin network.
4. Vascular and fibroblastic proliferation.
5. Fibrous reaction leading to firm scar.
6. Reaction to use.

It is obvious that these steps do not lead one to the other as through a series of gates but rather they overlap and intertwine to produce the process that we know as wound healing. Wound healing has been divided by some investigators into only two phases.[4] The process from destruction of tissue through the step of vascular and fibroblastic proliferation is the substrate phase and steps five and six in the above list are combined as the collagen phase.

In sports injuries, where early but safe return to participation is the goal, an understanding of the tissue sequence of repair is important. The effusion of blood and plasma starts at the time of injury and occurs for the first twenty-four to thirty-six hours. Coagulation of blood and plasma occurs early if the collection is small, and later if large or progressive. As coagulation occurs a fibrin network is laid down which forms the framework for repair. This period of clot formation begins at about twelve hours and is well established in thirty-six to forty-eight hours. Cellular proliferation, which is the actual process of repair, occurs very early in response to the tissue destruction. Fibroblastic and endothelial proliferation has begun at the end of a few hours and in the experimental wound is uniformly established by twelve hours. The fibroblasts begin to lay down collagen by the third day. The active process of fibrous union is well advanced by the fifth day after injury. The scar becomes firm, contracted and strong and at the end of three weeks there is fully formed non-vascular scar tissue. Although substances that accelerate the healing process are unknown, we recognize many factors which slow wound healing.[5] Some of these are important experimentally and in the field of surgery such as vitamin C deficiency, lowered body proteins, circulating corticosteroids, and wound x-irradiation. We are not concerned with these factors in sports injuries. However, we do deal with the following problems in wound repair.

1. *Hemorrhage.* It takes only a small amount of hemorrhage occurring from capillary and venous disruption to initiate the healing reaction. Further hemorrhage slows wound repair. It not only forms a mass which the fibrous tissue must bridge, but also it causes tissue damage which delays the repair.

2. *Edema.* Edema leads to a decrease in tissue vascularity with relative hypoxia and ischemia and a slowing of repair.

3. *Separation of tissue.* Any factor which separates the torn ends of the injured tissue will mechanically interfere with healing of this tissue. This is demonstrated in acromioclavicular joint separation in which the outer end of the clavicle springs upward separating the free ends of the torn ligament. Delayed healing can occur when other tissue is interposed between the ends of a torn ligament. It can also occur from a lack of immobilization, and from traction and mechanical separation of torn fibers.

4. *Infection.* Mild inflammation is a normal part of wound repair but it is an aseptic type of inflammation. A true infection calls forth tissue response leading to inflammation and suppuration and this response takes precedence over wound repair.

5. *Muscle spasm.* Muscle spasm may occur following any traumatic injury, but it is particularly prone to occur following injury to skeletal muscle. It leads to further traction and further damage to the injured muscle and to local and generalized ischemia in the limb involved.

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## THE PATHOLOGY (Continued)

6. *Corticosteroids.* The use of local corticosteroids in the treatment of acute sports injuries is currently popular. However there is no argument to support the use of these preparations in the early stages of trauma. In fact cortisone has been shown to suppress fibroplasia, and capillary and vessel proliferation.[6] Collagen synthesis has been shown to be decreased. The tensile strength of healing surface wounds is markedly diminished in experimental animals treated with steroids and the contraction of wounds is retarded. The mode of action of the corticosteroid hormones is thought to be at the cell membrane or on the ground substance or collagen. As the action of corticosteroids is known at present there is no indication for their use in the immediate care of acute lesions. Their role in the therapeutic regimen comes later when they are useful in suppressing fibroplasia. The usefulness of corticosteroids in the treatment of chronic athletic injuries is not subject to question.

7. *Disuse atrophy.* Disuse atrophy begins immediately when active motion is suspended. Following sports injuries it is important since true healing means not only firm fibrous fixation of the wound but also a return of muscles, ligaments, and joints to full power and full range of motion. It is important then to begin active motion as early as possible. Early active motion will not only aid in the absorption of hemorrhage and edema but will also keep disuse atrophy at a minimum.

It is obvious that pathology is not the only important basic science in the management of athletic injuries. A knowledge of anatomy, physiology, pharmacology and psychology are likewise requirements. However, to demonstrate the use of the principles of wound repair in planning treatment, we will use as examples the following sports injuries.

*A bruise or contusion* is probably the most common sports injury. Certainly they occur in all shapes, sizes, and degrees in sports. The immediate swelling and hemorrhage will continue for twelve to twenty-four hours. This is the time for the use of cold applications and pressure bandages to limit the extent of the hemorrhage and edema. Pressure will likewise produce approximation of torn fascia or ligaments. After twenty-four to thirty-six hours, heat, motion and massage are used to hasten absorption and allow repair of the injury. During the stage of fibrous repair continued use of heat to promote active circulation and active motion is advocated. The active motion has multiple benefits. An increase in circulation to the damaged area is obtained, and the tension and use improves the tensile strength of the fibrous repair.[7] Disuse atrophy is prevented.

In *a simple ligamentous strain* the same problems are present but active motion is even more important. In a ligamentous tear where actual disruption of the ligament can be diagnosed this ligament must be in accurate apposition if proper healing is to occur. This apposition can be obtained in many ways from simple pressure to firm immobilization in plaster. However, in many areas immobilization will not properly approximate an injured ligament and surgical repair is necessary. An example is the medial collateral ligament of the knee. When this ligament is completely torn so that abnormal lateral motion is present at the knee joint, the synovia is also torn and protrudes externally keeping the fibers of the ligament separated. This separation persists even when the limb is immobilized in a plaster cast. Since distraction results in poor healing, operative repair is usually indicated.

*The open wound* is not an uncommon athletic injury. Since most wounds are contaminated by equipment or by dirt from the playing field, each open wound must be treated as a contaminated wound. Tetanus should no longer be a problem in sports injuries since no athletic field should ever be contaminated with manure products, and since the players who participate in any sport which might involve an open wound should receive a prophylactic course of tetanus toxoid before participation. The open wound should be treated with soap and water cleansing and thorough irrigation using saline solution. If a wound is potentially infected it should not be closed. Old wounds, bites, and wounds with marked mechanical contamination should be considered as potentially infected.

### VARIATIONS IN HEALING OF SPECIALIZED STRUCTURES

*Muscle.* A muscle tear can be a prolonged, disabling injury to the athlete. This extended disability is usually the result of a delayed healing process. Striated muscle heals in two ways.[8] A clean incised wound or tear in striated muscle without the complicating factors of hemorrhage or muscle degeneration will heal by actual proliferation of the cells in striated muscle. This means that the muscle fibers heal without the interposition of scar between the two segments. If the muscle fibers are separated mechanically or by hemorrhage, this gap is filled in by granulation tissue and repaired by scar. Since this type of repair requires approximately three weeks, reinjury with additional hemorrhage is common. Rest, cold and pressure should be started immediately to limit hemorrhage and edema and to try to obtain primary union. The local hemorrhage after an injury of this type does not form a hematoma, but rather extravasates through the muscle. For this reason aspiration is not feasible but it is usually helpful to inject the torn area immediately with hylauronidase in one-half per cent procaine to relieve muscle irritability and aid in absorption of the hemorrhage.

Repaired tissue is active cellular tissue. Pathologically the fibroblast in the process of repair has similar evidences of activity to those shown by a fibroblast in an active fibroblastic sarcoma. This active tissue, particularly in muscle, does not withstand repeated trauma. Recurrent hemorrhage results. Further activity may result in the formation of a large, bulky, tender mass of active hemorrhagic and partially repaired tissue which will often calcify and end in a chronic, painful muscle mass that we know as a myositis ossificans. The basic problem in a myositis ossificans is repeated injury with marked tissue reaction. It is obvious that the best management is complete inactivity. These calcific deposits may take six months to resorb but they will heal completely unless stimulated by ill advised therapy or particularly by ill advised operative intervention.

*Tendon.* The repair of a completely severed tendon is a surgical problem, usually an incised wound, and is not a common sports injury. However, the pathology of tendon repair must be considered in the management of partial tendon tears which are commonly seen as athletic injuries. A tendon being a highly specialized structure heals much more slowly than fibrous tissue. It has been shown experimentally that the active cellular process of repair following a tendon injury continues for four to six weeks.[9] A sprain or strain of a tendon then leading to

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## THE PATHOLOGY (Continued)

In the later stages of the process the only solution is surgical removal of the bursa.

*Joint Structures.* Injuries to joints and joint structures often lead to damage either to the synovia or to the lining cartilage of the joint. The synovia of the joint capsule will not stretch. It is a vascular, non-elastic membrane which is torn when the joint is severely strained or damaged and gives rise to immediate hemorrhage into the joint cavity. The actual repair of the synovia follows the same pattern as the repair of fibrous tissue. The blood within the joint cavity leads to repair problems since it produces irritation and increased fluid accumulation. Moreover, blood is slowly absorbed from the joint cavity and in many cases will produce a pannus, or a layer of fibrin which is deposited on the inner surface of the joint. Since this can only heal by fibrosis, stiffness and limitation of motion are the result. It has been shown that motion of a joint hastens absorption from the joint.

The smooth cartilage lining the bony surfaces of the joint functions as a sliding structure, allowing motions of the joint, and as an elastic structure serving to take up shock following trauma. It has no blood supply of its own but gets its nourishment from the bone below it and from the joint fluid.[10] The nutrition from normal joint fluid is quite adequate. Loose cartilage bodies present within the lumen of the joint will survive for years receiving nourishment only from the synovial fluid.

With these facts concerning repair of joint structures in mind it is evident that blood in the joint should be removed. Since it is technically difficult to remove all the blood at one aspiration, and since the blood that remains after one aspiration causes continual irritation and an outpouring of more fluid, repeated aspiration is usually necessary until the fluid it clear. It should also be evident that a swollen joint is a damaged joint. Active motion of the swollen joint is indicated. Sports participation is contraindicated. Any joint condition that causes partial tear of some of the tendinous fibers may be a prolonged problem. If active motion is started too soon it will lead to irritation of the synovial sac through which the tendon slides and a tenosynovitis will result. Local immobilization of the injured tendons must be maintained until healing is complete, but to prevent adherence of the tendon to its sheath daily passive motion is advised after the first week. Free movement of the unaffected parts of the limb must be allowed.

*Bursa.* A bursa is a smooth, thin walled sac containing a very small amount of fluid. It is present over a bony prominence allowing skin, tendon or muscle to slide over this prominence. Normal repair processes apply to single injuries to a bursa, but in sports repeated injuries to bony prominences and therefore repeated injuries to the bursal sac are common. A chronic bursitis is formed by an irritation of an active repair process comparable to that which produces a myositis ossificans. The wall of the sac is damaged by trauma and begins its repair cycle. While it is in the active phase of repair another injury occurs and the process of repair is exaggerated. A fibrous nodule forms on the bursal wall and fluid accumulates because of irritation of the sac. Repeated injury may lead to more fibrous projections on the wall of the sac. These projections break off producing the melon seed bodies that are found in chronic bursitis. Protection from reinjury will avoid this chronic problem. After the chronic problem has developed, corticosteroids by local injection into the sac will decrease the fibrosis and lessen the irritation. prolonged swelling or repeated swelling should be corrected since it can lead to chronic damage to the lining cartilage.

CONCLUSIONS:

1. The healing of sports injuries is governed by the laws of wound repair.

2. A knowledge of the pathology of wound repair provides the basis for proper treatment of athletic injuries.

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## WIRE MESH SPLINT PROVES ITS WORTH

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The wire mesh splint, which is standard medical equipment in the Armed Forces, has a definite place in the Athletic Trainer's kit. It is extremely useful where fractures of the arm, elbow, forearm, wrist, and ankle are concerned.

The wire mesh is 5" wide and 36" long, and as the splint should be well padded, a piece of ¼" felt 5" wide and 18" long is used for this purpose. The felt is rolled up with the wire when the splint is not in use. When rolled, this splint (including the felt), has a diameter of only 2½", so it does not take up much room in the kit. The felt tends to make the splint sturdy, but if for some reason a more unyielding splint is needed, the wire may be doubled back to give more support.

Probably the wire splint's most important asset is the fact that it may be molded into just the correct contour by fitting it to the opposite member of the injured part. It is then secured with roller gauze, cravat bandages, or similar material.

If this splint cannot be obtained commercially, it can easily be made from wire mesh obtained at a local hardware store.

# BASEBALL TRAINING

DON FAULS, *Trainer*

Florida State University

Preparing for a baseball season requires the players to start preliminary work, on their own, about a month before practice sessions start. In order to be ready for the opening practice, time and effort must be expended to get into condition. Pre-practice work should be divided into four (4) categories: Running, Stretching, Throwing, and Weight work.

## RUNNING

Early conditioning requires plenty of running. The only way for any player to develop speed and stamina is to run, run, run. It is the *only* way to get into shape. Good legs make good ball players. Running is hard work and demands initiative and self-sacrifice. This applies to all players, especially pitchers. Remember, it is possible to play with a sore arm, but practically impossible to play with a sore leg.

## STRETCHING

All parts of the body need plenty of stretching. Stretching exercises will prevent muscle pulls in the legs and back. All players, especially pitchers, should stretch their arms. To stretch the arm, all one needs to do is to hang from a suspended bar, the top of a door, or any other available place that is above the head. This will also stretch the shoulder muscles. Just hang for a minute or so: *no pullups*. Do this anytime, but particularly, just before the daily workout. Two (2) or three (3) stretches of a minute or so will suffice; *Do not overdo it*. It should be continued throughout the season. Make it a daily habit.

## THROWING

After stretching good, start throwing easily. Test and find out how much easier it is to throw after a good arm stretch. Throw every day. Don't throw hard until the arm is warmed up.

For the pitchers in early season practices: Don't throw hard for a week. Start spinning curves the first day. Don't try to break them off, just spin the ball to get the feel.

## WEIGHT WORK

This phase of training applies to pitchers. However, other players may use it after consultation with the Coach or the Trainer. Working with weights is not designed to develop bulging muscles, but to develop muscle tone. The following is a tentative program that can be followed:

Get a barbell or any fifteen (15) lb. weight that is easy to control. Standing, with the arm at the side in full extension, palm up, eight in hand, *flex* the arm *slowly* to complete flexion. Return to full extension. Do this ten (10) times. This exercise strengthens the anterior arm muscles, *above the elbow*. Then, in same basic position but with the lower arm in the midway position (thumb pointing up), repeat above exercise ten (10) times. This exercise also strengthens arm muscles, *above the elbow*.

To strengthen muscles in the *back of the arm, above the elbow:* Raise the arm above the shoulder with elbow bent (flexed), straighten arm ten (10) times.

To strengthen muscles of the arm, *below the elbow:* Elbow and lower arm resting on table with wrist extending over end of table, weight in hand, palm up; flex wrist ten (10) times. These muscles are the most important for wrist action in throwing the curve ball or any breaking pitch.

The Rotator muscles of the wrist and elbow are strengthened by assuming the same position for *below the elbow* work. Turn hand over so that it faces the floor, then return to starting position. Ten (10) times.

These exercises are to be done *only three (3) times per week*. Add one (1) repetition to each exercise per week. In other words, each exercise is done ten (10) times per day, three (3) days a week. The next week, each exercise is done eleven (11) times per day, three (3) days a week, and so on until twenty (20 repetitions per day are reached.

Here at Florida State, this program is instituted in the fall of the year. When the maximum of twenty (20) repetitions are reached, the player is called in for evaluation and consultation.

Let me emphasize again that these exercises are not designed to develop Charles Atlas muscles, but to tone and strengthen the important muscles used by a pitcher. For players, other than pitchers, twice the number of repetitions per day are recommended.

## TIPS FOR PITCHERS

Pitchers should always do their running just before going into the clubhouse, at the end of practice. In this way, the pitcher gets up a good sweat and goes in rather than stand around with a damp sweat shirt, which may lead to a sore arm. All pitchers should have at least two (2) sweat shirts. Prior to a workout on a cold, windy day, it is advisable to put some oil on the arm, shoulder, and back. After a good workout or after pitching a game, pitchers should get a massage on the arm, shoulder, and back muscles, with alcohol. This is done to close the pores and to prevent sore arms. This massage should be of short duration, only enough to close the pores.

Pitchers, as well as all players, should play plenty of "Pepper" games. This helps to develop quick reflexes. Also, these games are good exercise, good for stomach muscles and overall conditioning.

Many pitchers develop a blister on a thumb side of the middle finger of the pitching hand. This is caused by the pressure exerted on the ball by this finger—especially when throwing the curve ball. The finger nail is always pointed in this area. When pressure is exerted on the ball, as in throwing the curve, the point of the nail projects into the skin, causing a blister to form. What it amounts to is a soft surface being compressed between two hard surfaces. This condition can be eliminated by keeping this point of the nail filed down. Never use clippers on this nail. Use a nail file.

## EMERGENCIES ON THE FIELD

Any player hit on the head with a pitched or a thrown ball should be carefully examined, before he is moved. If injury is severe, player may be unconscious, eyes may be dilated, or bleeding from the ear. Any or all of these symptoms may be present. If so, call a doctor. Let him handle the case.

Any severe fracture can be seen immediately. The fractured area will be distorted. The utmost care should be exercised to prevent further injury. Splint and send to the hospital as soon as possible. A catcher's shin guard makes as fine a splint as one could use.

If possible, always have a doctor present. However, if the team has a trainer, he will know what to do in these emergencies.

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## BASEBALL TRAINING (Continued)

TREATMENT FOR "STRAWBERRIES"

Shave area around wound. Paint the shaved area with Tuf-skin or benzoin. A sterile gauze pad is covered with a good ointment (zinc oxide and placed on top of the wound. Two or three extra gauze pads or a piece of combine roll are placed on top of the first pad. This is taped to the skin, starting from the bottom and working up. You now have an extra sliding pad over the wounded area. Also, the wound will heal from the inside out, eliminating a scab.

GENERAL COMMENTS

All players should wear a helmet while batting.

Players that get frequent blisters on the finger tips should use Tuf-skin or benzoin on them. This will toughen the skin.

Break in new shoes and gloves in pre-season workouts. They will be broken in for use during the season.

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## THE DISLOCATED SHOULDER AND ITS AFTER CARE

By MR. JAMES BALLANTINE, R.P.T.

Trainer, Cody, Wyoming, Public Schools

The dislocated shoulder is a subject of which in the past many, many articles have been written. There are various viewpoints on the after-care of this type of injury. I will attempt to describe the method of treatment I have followed during my career as a physiotherapist. I have had occasion to treat 54 patients with this injury having spent eight years in the Physiotherapy Department of a large Orthopedic Hospital near Glasgow, Scotland, and a further four years in a General Hospital in Wyoming, U.S.A. The results obtained using this pattern of treatment have been excellent.

Most shoulder dislocations arise from some forcible violence that drives the head of the humerus forwards, the commonest cause being a fall on the outstretched arm. Also if the person falls with the limb partly in front of the trunk the force is still resolved into a forward drive of the humerus on the glenoid, because of the plane of the joint being obliquely forwards, the so-called anterior dislocation. When the fall is backwards either on the arm or the elbow, then the forward drive is much more obvious. The dislocation can also occur by forcible external rotation or extension of the partly abducted arm; as in the hand-off at football. This again thrusts the arm and the humerus forwards. Generally always the capsule of the joint is involved. There is either an avulsion or a tear. Frequently the capsule itself is avulsed from the scapula.

No matter the type of injury it will heal properly only if the joint is given complete rest from external rotation for the first 21 days following the injury. There are various complications that can occur with the dislocation of the shoulder, for example, 1. Fractures of the Glenoid or of the Humerus, 2. Nerve injury, especially to the Circumflex Nerve, thus involving a paralysis of the Deltoid Muscle, 3. Vascular injury resulting from pressure on the vessels of the axilla. However, I will deal only with the Anterior Dislocation of the shoulder without complication.

After examination by a physician and the diagnosis has been established; the patient's dislocation has been reduced and the injured limb placed in a sling (either the triangular type or the collar and cuff type) the following treatment schedule is authorized and carried out.

Beginning the day after reduction the patient is given two 30-minute treatment periods daily consisting of 20 minutes Infrared and ten minutes of exercises. The exercises that are performed are specific Remedial Exercises relative to the injury and adhere to the following aims of treatment:

1. To maintain the muscles of the shoulder joint.
2. To maintain the muscles and the mobility of the Shoulder Girdle.
3. To maintain the muscles and the mobility of the Elbow, Radio-Ulnar, Wrist and Finger joints.

The exercises taught and carried out for the first seven days following reduction are:

a. Deltoid Contractions. Tensing the muscle fibres slowly without producing pain, then relaxing.
b. Pectoral Contractions. Tensing the fibres of Pectoralis Major.
c. Arm pressing inward. Press injured arm to trunk, hold, then relax without producing pain.
d. Shoulder raising without producing pain.
e. Shoulder bracing without producing pain.
f. Bending and stretching Elbow joint. Flexion and Extension.
g. Forearm turning. Pronation and Supination.
h. Wrist bending and stretching. Flexion and Extension.
i. Making a fist and Relaxing.

All of the exercises are performed sitting and the sling remains in position.

From the eighth day to the 21st day the above exercises are repeated with the following new exercises added: with the next group the arm is removed from the sling but the injured limb is supported by the Physiotherapist.

a. Arm raising forward. Flexion.
b. Arm raising backward. Extension.
c. Arm raising sideways. Support the head of the humerus during this exercise.
d. Arm carrying across Chest.
e. Arm turning. Internal rotation only.

During this second phase of treatment, gentle massage may be given following the Infrared and prior to the exercises. The massage should begin with stroking of the whole arm, effleurage of the shoulder, neck and chest to reduce the swelling, if any. Beginning on the 14th day Frictions around the shoulder are given and the massage is deepened, especially to the Deltoid and the Pectoralis Major. However, it must be foremost in the mind of the person giving the massage that the doctrine of Physiotherapy is that the patient must cure himself. The great danger in massage is that the patient will recline on the massage table and wait to be cured. The massage and Infrared are a valuable preliminary to the active exercise but they are not an end in themselves. The patient must have it impressed upon him that we cannot cure him but we can show him how to cure himself.

Following the removal of the sling the exercises are graduated in strength and mobility and the use of the cord and pulley circuit to restore the range of elevation by Auto Assisted Active Tension movements are extremely valuable in the intermediate phase of recovery.

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## DISLOCATED SHOULDER (Continued)

The following list of exercises are especially useful to maintain the primary aim of treatment.

a. Standing facing the wall, crawling up the wall with the fingers of the injured arm and reaching as high as possible without bending backward. This exercise should be performed slowly and smoothly.
b. Standing as above but with the injured side toward the wall again being careful that the patient does not flex toward the sound side.
c. Lying on the back, internally and externally rotating the shoulder with the upper arm being supported on the floor.
d. Placing the injured arm behind the neck and the Lumbar Region alternately.
e. Hands behind the head, elbows pressing backward and pulling forwards.
f. Use of weights on the cord and pulley circuit to give active resisted exercises for Flexion, Extension, Abduction and Adduction of the Shoulder and Scapula, the weights being graduated accordingly.

Some useful points to remember in the treatment of a Dislocated Shoulder are:

1. If strict immobilization of the Shoulder is carried out for the first 21 days and nothing other than the treatment and the exercises listed for that period are given there is little or no danger of a recurrent dislocation.
2. Dislocations of the shoulder are the same as dislocations of all the other joints and recurrent dislocations are the same—they arise from faulty treatment of the primary injury.
3. When the shoulder has been immobilized for the period of 21 days so long as all the other joints have been exercised constantly and conscientiously, there is little or no danger of permanent stiffness of the shoulder joint.
4. There must be no Passive Stretchings of the Shoulder, this can be the cause of permanent stiffness and may even result in Myositis Ossificans.
5. Full strength and mobility can be regained and recovery can be complete in a period of six to eight weeks from the date of injury.

*Summary*

It is the purpose of this article to give the readers the salient points of the treatment and from my personal experience I have found the results obtained are good; of the 54 patients treated 51 were Anterior Dislocations and three Posterior Dislocations. In the follow-up the patients were seen 12 months after the injury and 47 of them had excellent results with no recurrence of the Dislocation. Four were reasonably good results but could not perform a complete and full range of movements, three were definite failures.

If the patient and the Physiotherapist have both done their best and been conscientious, then the results obtained from this procedure are good.

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# WATER AT 67° TO 69° FAHRENHEIT TO CONTROL HEMORRHAGE AND SWELLING ENCOUNTERED IN ATHLETIC INJURIES

DON BENNETT, *Head Athletic Trainer*

Houston, Texas, Public Schools

People in the training profession are turning more and more each day to the scientific aspect of rehabilitation of injuries that confront them. This is as it should be. Not only that, but those of us who have to work with this type of rehabilitation should feel the personal obligation to investigate and assure ourselves and the athlete that the utmost in scientific knowledge is being taken advantage of.

We have all heard and read of trainers who initially treat injuries that involve hemorrhage and swelling by using heat, while others go to the other extreme of using some type of cold applications. The recent trend is towards the use of some type of cold, since it has been agreed that the heating of a part initially will cause more swelling.

In using the different means of producing a cold effect several questions seem to reappear; namely, how cold and for how long should the cold applications be continued? A great many in our profession use ice packs of some nature. When we hear and think of ice being used, we possibly visualize that the cold restricts the blood flow to the periphea. Many of us thought that the answer had been arrived upon.

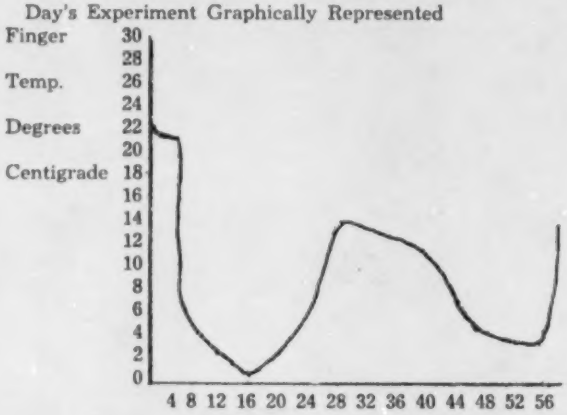
The use of ice is attributed the function of helping to check hemorrhage, and thus preventing swelling as much as possible. All of this is vital to initiate treatment and insure a more rapid recovery. The next question that comes to my mind is "does ice do this"? To my knowledge, there have been no controlled experiments along these lines. From reviewing the literature, it is my opinion that ice packs do not achieve these desired results.

The skin temperature is proportional to the environmental temperature, and its temperature will continue to drop as low as 2° C, while the core or deep body temperature is dependent upon the metabolic rate of the person. As some trainers use ice over the area from 30 minutes to 24 hours, and some longer, depending upon their belief of its use, it would seem that the area covered by the ice pack would soon become the same or nearly the same temperature as the ice. True, this is but a small area compared to the entire body surface, but when the body is exposed to cold that intense, there is vaso constriction. This allows the body's core to become smaller, and the insulation of the core to become greater in thickness. The body will go along with this for a while, but before it will allow the tissues to be injured it will adjust and increase the circulation to the area being jeopardized. This circulation increase brings heat from the deep body to be dissipated at this site. Depending upon the degree of cold, shivering will take place, causing an increased metabolic rate and in increased circulation or minute volume. Also accompanying these changes would be vaso dilation. These are items we are actually trying to prevent. We don't want this increased circulation to an injured area. That is, we don't want the injured area to become so cold and at a depth that these changes reflexly take place. Rather, we want the restriction which is produced by controlling the degree of cold that will not bring on the secondary reactions mentioned above. Physiologists find that minimal blood flow to a body part is achieved through temperatures approximately 67° to 69° F.

The foregoing explanation, keep in mind, is for the entire body to be subjected to lowering of temperatures. Shivering should not play as important a role as would the intense cold to the injured area. The author has never seen an athlete shiver from the use of ice packs while being treated initially, but the injured area is still a part of the body's live tissue and it is felt that ice packs will promote these secondary reactions spoken of a moment ago.

Day [1] showed that the temperature of fingers immersed in an ice bath dropped from 22° C to 2° C in fifteen minutes. In this same experiment he showed that, as the temperature dropped to 2° C there was a rise of finger temperature which rose to 13° C, following which there was a series of rise and falls in temperature. These rises of temperature can be attributed to an increased flow of blood to the area. This temperature rise is circulated from the core or deep body. His experiment shows the reflex action the body has that will not allow the parts to be damaged.

Day's Experiment Graphically Represented




Time in Minutes of Finger Immersion

Lewis [2] says "In the absence of freezing, adequate cooling damages the skin and releases H substance and the latter may be liberated in quantities sufficient to produce local vasodilation and added arteriolar dilation depending upon an axon reflex in sensory nerves, or even a triple response." He also says, "the vasodilation occurs in water 18° C - 15° C or lower but is not known at higher temperatures." Lewis also found that ice to the skin for one and a half to two hours drops the temperature 15° - 26° at a two-inch depth. The nearer the tissue to the cooling agent, the lower the temperature drop. Thus, the outer skin would be somewhat colder than the tissue at the two-inch depth. That would lower the temperature to near 70° F at the two-inch depth, and would of nature be quite colder as the tissues near the surface. This is felt to be cold enough to produce these secondary reactions of protection which result in an increased blood flow to the area. This is the one thing we are trying to limit.

Kovacs [3] said of using ice bags, "this cooling effect is quite penetrating; it has been shown that with ice bags applied to the calf of the leg for 1½ to 2 hours, a drop of 15° - 26° F has been recorded."

Experiments performed by the above three men rather convincingly relate to us that more desired results might be obtained by controlling the temperatures of our cold applications. Lowering the temperature about the injury

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## WATER AT 67° TO 69° (Continued)

as low as ice to skin will do, will certainly start axon reflexes into operation to direct blood flow and a rise in temperature to the iced area. The body does this to protect the tissue from injury. It is therefore felt that we might more nearly obtain our desired results with water at 67° F - 69° F. This would be cold enough to obtain the minimal blood flow determined by physiological experiments.

Please keep in mind, that to present reviewing of the literature, there have been no experiments along these lines on injured athletes. The indication for controlled temperature is based on the above mentioned experimental data. One other point that might help to clear up this idea of controlling temperature at 68 - 69° F as opposed to over-cooling an injured part: the next time it snows in your area, get out and throw a few snow balls with your bare hands. You won't leave the snow balls in your hands nearly so long as you do the ice packs to an injured area. After throwing a few, look at the palms of your hands. They will be quite red. This redness is due to an increased circulation to these areas. This of course brings warmth to the hands and protects them.

This controlling of temperature through the use of cold water might be somewhat difficult to do. In some areas of our country the tap water will be exactly the desired temperature, in others it might be too cold, and others too warm. The main problem would be to cool down the water in the warm areas. This might be done through the use of a cold-drink box that uses cold water as its means of cooling soft drinks. By setting the thermostat of such a box, the desired results could be attained. One other problem that arises is a means of application. The one that has been thought up, but not actually perfected, is the use of fishing waders that have been renovated so the water can be circulated through them. An inlet connection at the toes, and an outlet in the back and towards the top is necessary for the water to enter the waders, be circulated about the injury, assuming it is one about the lower limbs, and leave, so that the temperature might be more evenly maintained. A similar device might be constructed for the upper limbs.

At this time it might be well to inject this finding, that if you have a sprain of the right ankle and you are trying to cool it down and retard the flow of blood to the area, cool down as much of the body as possible, the entire extremities of the lower limbs, and you will achieve the results much quicker. In cooling down the extremities, assuming you are using a device such as the waders, there could be used the triad, cooling, elevation and pressure—a hard combination to beat. As for the cooling down of a body part and having better peace of mind that the desired results are being obtained, water at 67° F - 69° F is preferred.

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## KNEE AND ANKLE INJURIES*

By Stephen E. Reid, M.D., and Mr. Thomas E. Healion**
Evanston, Illinois

Athletic injuries require different attention than those of the general student body or of the population at large. This specialized attention is not meant to make the athlete a prima donna. An injured athlete cannot be treated in the routine fashion of allowing nature to take its course. Time is essential and many short cuts must be taken to get the player back to his team. The routine care of plenty of rest to the injured part cannot be followed. This type of treatment does not mean detrimental care to the athlete. It requires willingness of the athlete to endure a variable amount of temporary discomfort for the sake of time.

Surgeons generally are becoming increasingly aware of the advantage of early ambulation after major abdominal operations. Patients are encouraged to get out of bed on the day following surgery. Fractured hips in the elderly are nailed and these patients are mobilized immediately with gratifying results. Certainly if these major insults to patients of all ages can be treated without complete rest, an injury to an extremity of a well conditioned football player requires less rest than we have been accustomed to use.

That rest of an injured part can be detrimental is shown by the case of a middle aged man who sprained his ankle in a fall from a ladder. He was instructed to go to bed and rest his injury. When two weeks stay in bed had not healed his injured ankle, he was instructed to continue resting his ankle. After six weeks of rest and out of work, he became desperate and hobbled in on crutches. His ankle was completely stiff, swollen, and indurated. He was unable to bear weight. This man had developed greater disability from disuse than from his original injury.

Since athletes, and particularly football players, are subjected to considerable body contact, their injuries are the result of rather violent force and can often be of a serious nature. We, therefore, x-ray all but obviously minor injuries because of the possibilities of fractured bones. Fractures are thereby discovered early and their treatment instituted.

Our discussion here will cover only soft tissue injuries since they are more common and often more serious. Soft tissues cannot be diagnosed by x-ray examination and therefore may be neglected.

The rapidity with which the athlete can be returned to the game depends on many factors:

1. *The seriousness of the injury:* Obviously, complete tears of the ligaments of the knee, or dislocations at the ankle, will require months, whereas a simple sprain of a joint may cause very little if any disability.
2. *The desire of the athlete to get back to the squad:* A boy may use the injury as an excuse for not being on the first team. He may not have any real desire to play football, but feels he should because of his

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*Presented at Conference on Athletic Injuries, sponsored by Charitable, Educational and Scientific Foundation of SMS; November 7, 1958, Milwaukee.

**Team Physician and Head Trainer, respectively, Northwestern University, Athletic Department.

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## KNEE AND ANKLE (Continued)

size; his family, or fraternity brothers, may have encouraged him to go out for the team. This boy may not want to heal his injury. A surgeon cannot put desire into a knee joint. We have been impressed with how few injuries we have after a winning ball game.

3. *The conditioning of the athlete before the injury:* A well conditioned athlete is protected by good muscle tone. We have had many more injuries in the beginning of the season than later. Since the joints are protected by good conditioning, the injury is usually more minor and the recovery period is shorter.
4. *Cooperation of the player, the coach, the trainer, and the physician:* The player must be willing to follow the prescribed treatment for his injury. The coach must see to it that the player cooperates with the trainer, and the coach must realize that the physician is anxious to get the athlete cured.

The trainer must be interested in his work, in the team, and in the athlete. The trainer and the team physician must know the shortcomings of each other and must have easy communication. The physician must be interested in the athlete's welfare and yet realize the importance of the boy to his team.

In our experience with the varsity athletic injuries at Northwestern University during the past ten years, ankle injuries have been a lesser problem than knee injuries.

In the absence of a fracture the ankle is wrapped in an elastic bandage. This prevents swelling and allows the ankle to be treated on the following day. Depending on the amount of discomfort, the patient is instructed to bear weight, or use crutches. On the following day after a treatment, the ankle may be strapped and the athlete instructed to walk. He should attempt to walk without limping if possible. It is better to use the ankle normally for a short time rather than limp around for longer periods. The athlete who can walk without a limp is then allowed to jog, and as tolerated, to sprint without cutting. Only when the patient can sprint is he allowed to cut, and finally full activity is encouraged.

Occasionally an obviously severe injury to the ankle is noted without x-ray evidence of fracture. One must be alert to the possibility of a separation of the tibiofibular joint causing a widening of the ankle mortis. This may be demonstrated by x-rays of the ankle in inversion and eversion. In this injury, in addition to the ligaments being torn at the ankle, there may be a tear of the interosseus membrane. This injury should be treated with a cast. After several months calcium may be demonstrated at the site of the tear of the interosseus membrane above the ankle between the tibia and fibula.

Weak ankles can be protected with ankle wraps or adhesive strapping. Since most injuries to the ankle are caused by forcibly inverting the foot, strong leg muscles and tendons splint the ankle and protect this joint. Leg condition, therefore, is vital in the protection of the ankle joint.

Our most common injury and our greatest problem concerns the knee joint. The long bones, the femur above and the tibia below the knee, provide longer effort arms and cause greater strain on the knee joint. This joint cannot be braced adequately to stand such strain without restricting its motion. The football player who wears long aluminum cleats for better footing fixes the foot to the ground. When a blow is applied to the outside of the knee, medial bowing of the leg occurs which may open the joint and possibly rupture the medial collateral ligament. The cruciate ligament and cartilage also may be torn. With these long cleats and with the ankle firmly strapped, there is no "give" and the entire thrust of the blow must be borne by the knee.

We have observed that once a knee is injured, in practically all cases it is subject to re-injury. A good share of our knee problems were the result of previous high school trauma. The disability following a knee injury results in a weakness of the quadriceps muscle group. By favoring his knee the player loses the conditioning he has developed in this large muscle group of the front of the thigh. The power of this muscle which is the greatest protection to the knee, when lost, allows any blow to the knee to be taken by the knee ligaments. The knee then is more easily injured causing more disability and resulting in more quadriceps atrophy. We have seen a two-inch difference in circumferential measurement between the two thighs in a recurrent knee injury.

A case in point is that of a player who injured his knee several times throughout the season. He continued to play football and to maintain the tone in the quadriceps muscle. On examination at the conclusion of the season, this player had a perfectly stable knee joint. He was operated upon for a torn lateral semilunar cartilage which was removed, but in addition, tears of the anterior cruciate and medial collateral ligaments were found. The stability of this knee was maintained by the well-developed quadriceps muscle.

What can be done to protect the knee from injury? The knee joint is supported by four main ligaments.

1. The medial collateral ligament splints the medial side of the knee. Tenderness is elicited over its points of attachment to the femur and tibia when this ligament has been injured. Abduction of the knee stretches an injured ligament and causes pain. A torn or stretched ligament allows the medial side of the knee joint to open with abduction and demonstrates medial instability of the joint.
2. The lateral collateral ligament splints the lateral side of the knee and produces similar clinical findings with injury to the lateral aspect of the knee.
3. The anterior cruciate ligament crosses the inside of the joint. It attaches ot the tibia in front and the femur behind. This structure prevents the tibia from slipping forward on the femur.
4. The poterior cruciate ligament criss crosses with the anterior cruciate ligament, but attaches to the tibia behind and in front. This structure prevents the tibia from sliding posteriorly on the femur and prevents hyperextension of the knee.

An injury to the cruciate ligaments is demonstrated by forward and backward motion of the tibia on the femur with the knee in 90 degree flexion. This is the so-called positive drawer sign.

The quadriceps muscle in front, and the hamstring muscles in back of the knee add additional support to the knee joint. These muscles can be developed to such a degree that a general anesthetic is required to demonstrate instability of the knee joint due to injury of the ligaments.

Since these muscles support the ligaments of the knee so adequately, conditioning exercises should protect the knee. With weights attached to the foot the athlete, with maximum effort, is required to extend the knee fully. The quadriceps muscle is so developed that the football player is able to lift 90 to 100 pounds successively 10

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## KNEE AND ANKLE (Continued)

times. Similarly with weights attached to the foot the athlete flexes the knee against increasing resistance. This exercise strengthens the hamstring muscles.

In the two years, 1951 and 1952, we had 34 knee injuries. Since instituting these exercises two years ago we have had only 8 knee injuries.

The long cleats are also avoided to minimize the chances of knee injuries.

Unstable knees or those with weak ligaments are strapped before all scrimmages.

*Summary*

We have attempted to show how muscle conditioning splints the knee and ankle joints and protects their ligaments. We have been impressed with the magnitude of some knee injuries and realize that mere casting offers little in the permanent cure of torn ligaments. Early operative intervention is the logical approach in the repair of torn ligaments.

## NEW BOOKS

William Dayton, Head Athletic Trainer, Yale University, has recently completed a book entitled "*Athletic Training and Conditioning.*" In the opinion of the Editor this is one of the finest and most complete books ever published on Athletic Training. This book covers almost every problem of Athletic Training in clear concise detail. It defines the duties of the Trainer as well as what responsibilities lie in the hands of the team physician.

I feel that every Trainer, Student Trainer or Coach will have a very valuable edition to their library if they secure this book. It can be purchased from the Ronald Press Co., 15 East 26th St., New York 10, New York. The price is $6.00 per copy.

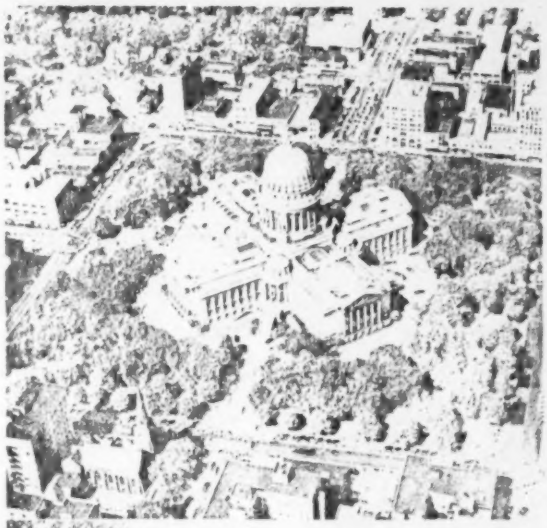
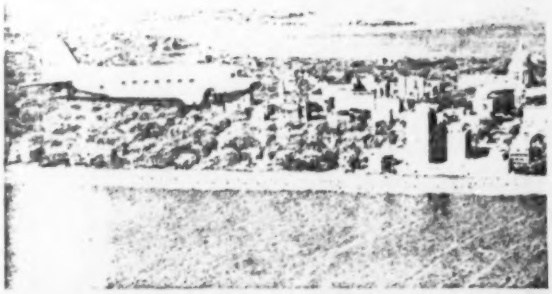
Editor.

## MADISON AT A GLANCE

Capital of Wisconsin, Four Lakes City, home of the University of Wisconsin, recreational center, important shopping and manufacturing center . . . this, in part, is Madison.

The city is located on an isthmus between tree-trimmed Lakes Mendota and Monona, 845 feet above sea level, fanning out at either end to follow miles of wooded bluffs and level land along the shorelines of the two large lakes and smaller Lake Wingra to the south.

Dominating the center of the city is the white granite capitol, located in beautiful Capitol Park. On all sides of the surrounding Square are modern stores, hotels, restaurants, theaters, and office buildings. From the dome of the capitol, five lakes can be seen—the three nearby lakes, plus Kegonsa and Waubesa to the southeast.

Seven blocks away from the Square, at the end of State Street, is the University of Wisconsin, its vast campus running for more than a mile along the picturesque southern shore of Lake Mendota.

In Madison you'll find genuine hospitality, the finest accommodations, the latest movies, and delicious food, straight from the heart of America's Dairyland.